

GTS SERIES

MULTI-TURRET CNC TURNING CENTERS



THE ULTIMATE MACHINING POWER
WOODWAY

GTS *series*

TWIN SPINDLES · TWIN TURRETS

DELICATE MACHINE SIZE

EXTREME CUTTING CAPACITY

A FULL RANGE AUTOMATIC SYSTEM

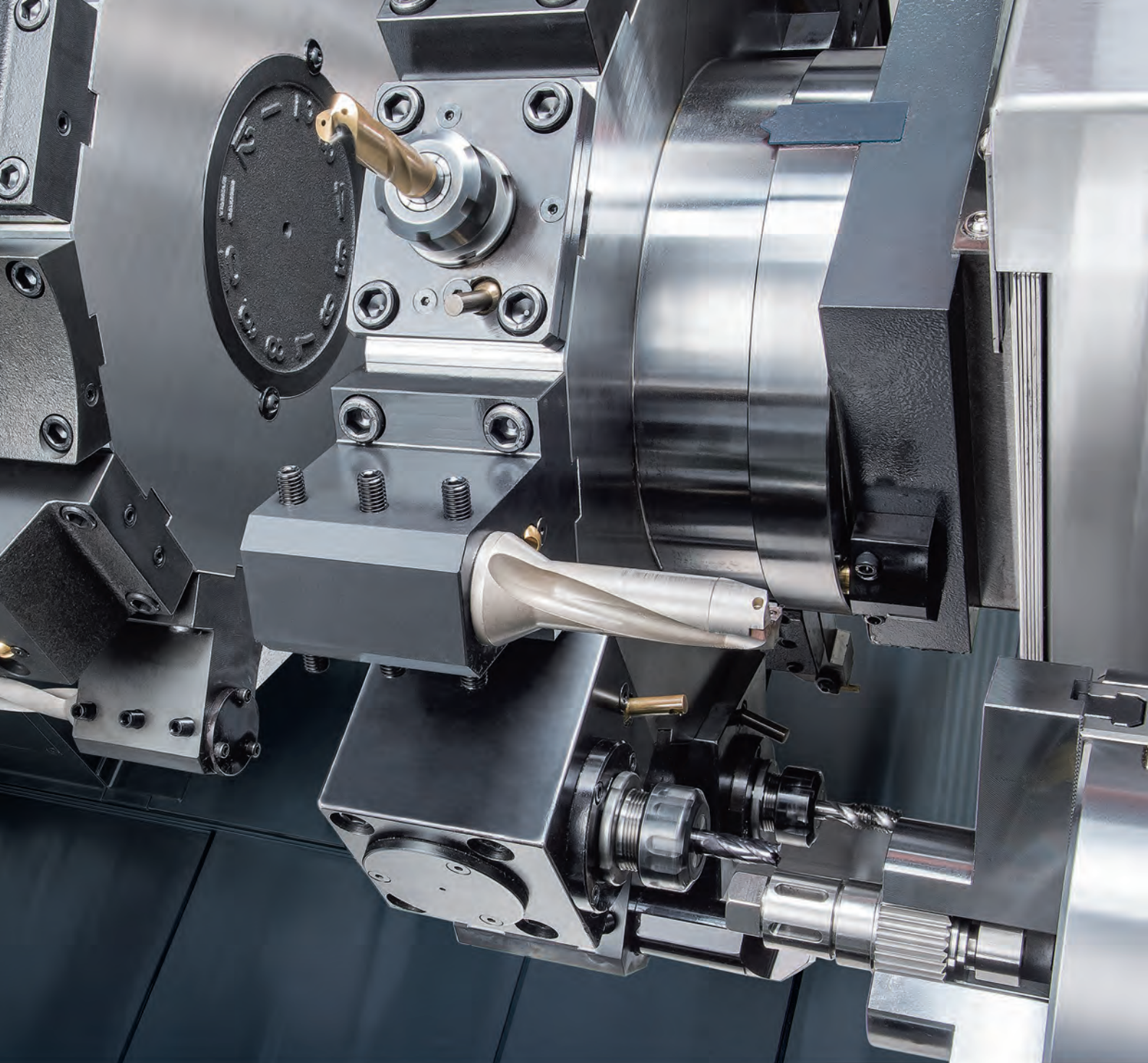
GTS evolved into impeccable performance and reliability by long-term customers' experience and feedback



GTS series line-up

		Left	Right	6" Chuck	8" Chuck	10" Chuck
Twin Spindles		Turret	Turret	GTS-150X	GTS-200X	GTS-260X
		Live Tooling Turret	Turret	GTS-150MX	GTS-200MX	GTS-260MX
		Live Tooling Turret	Live Tooling Turret	GTS-150MMX	GTS-200MMX	GTS-260MMX
		Y-axis	Y-axis	GTS-150XY	GTS-200XY	GTS-260XY

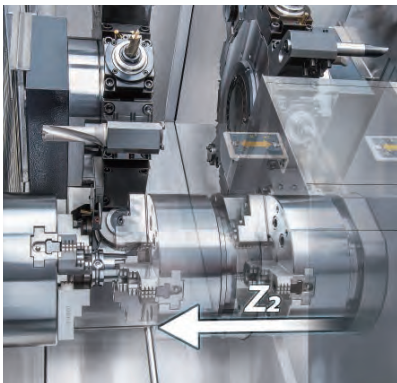
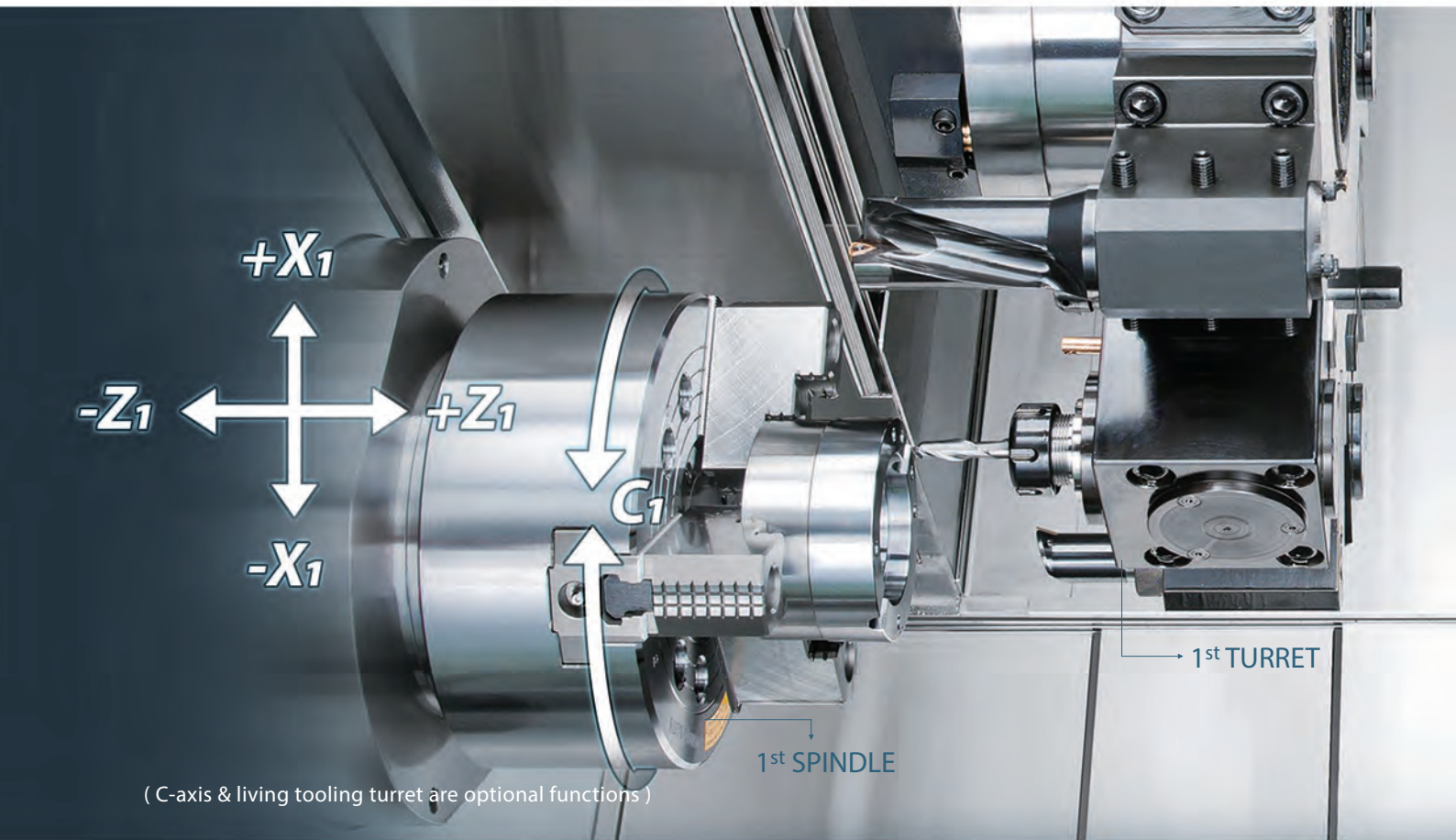
(Y-axis function should options live tooling turret necessary)



Complicated machining operation of front & rear side can be done by one GTS series .

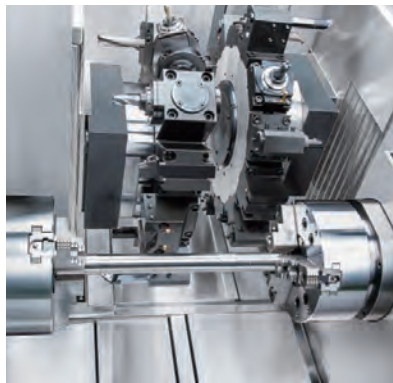


EXTREME MACHINING PERFORMANCE



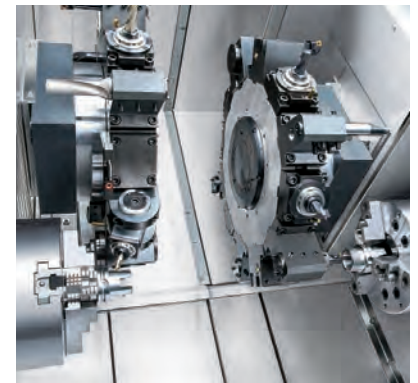
2nd Spindle Catches Parts Automatically

2nd spindle catches parts from 1st spindle and automatically machining rear side to avoid the error of movement manually by the operator.



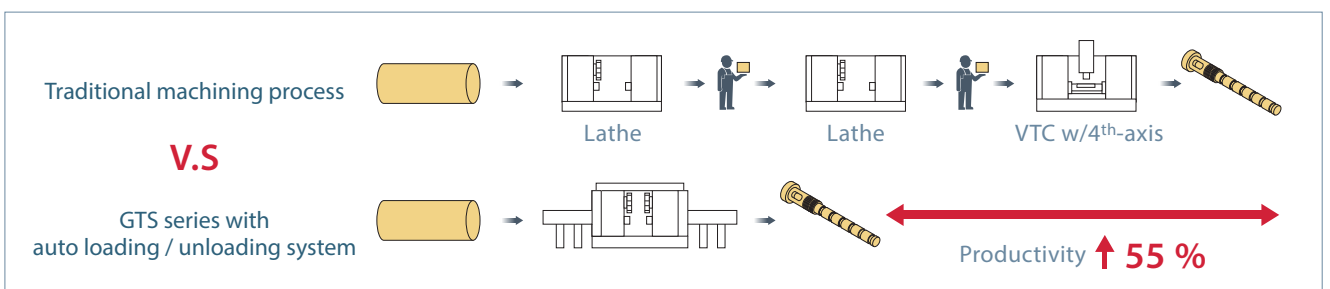
Twin Spindles Simultaneous Cutting

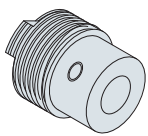
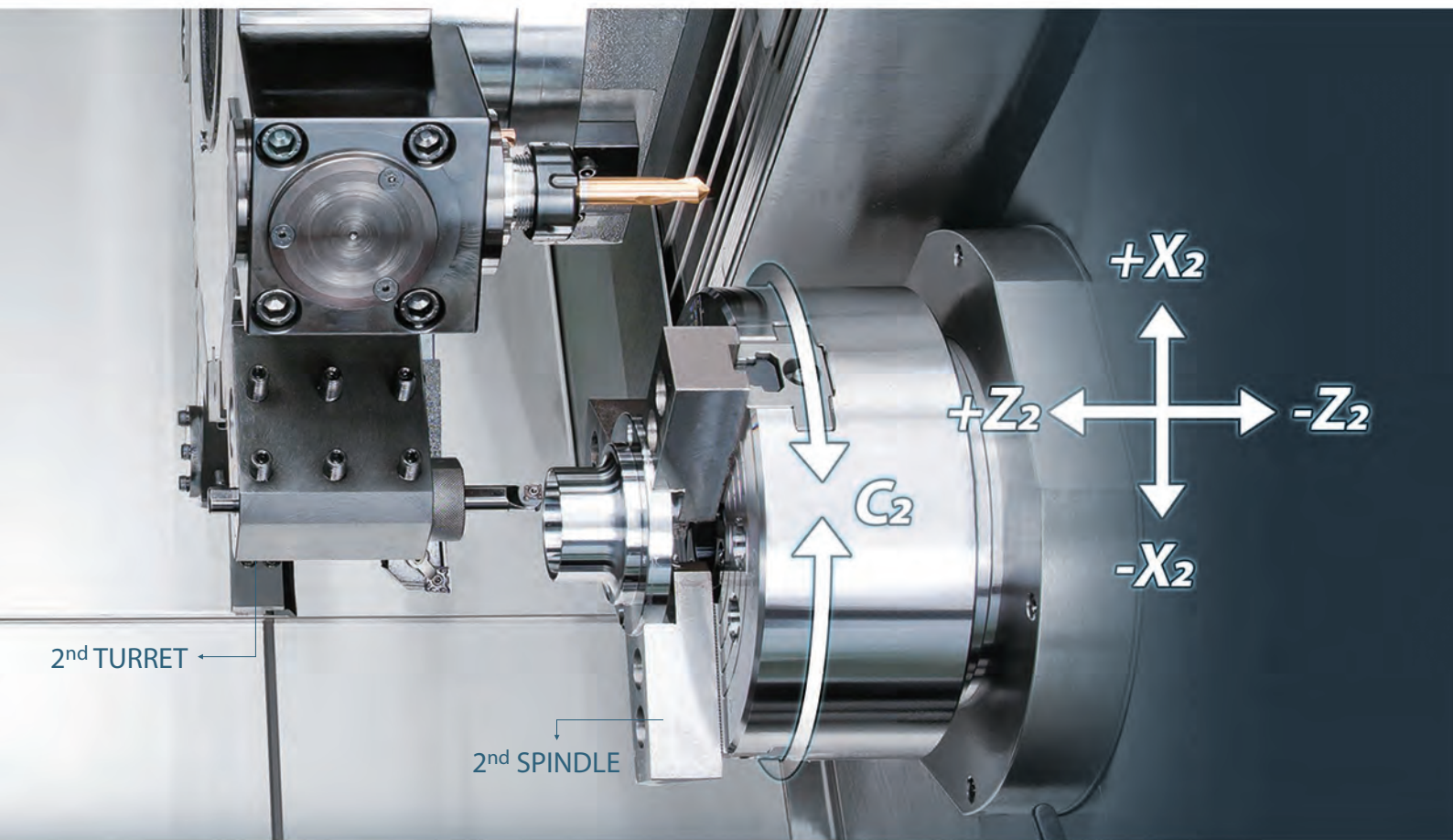
By clamping two ends of the long bar on each spindle and rotate synchronous to avoid the run out of rotating by single side clamping.



Front / Rear Side Synchronous Cutting

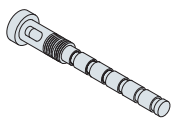
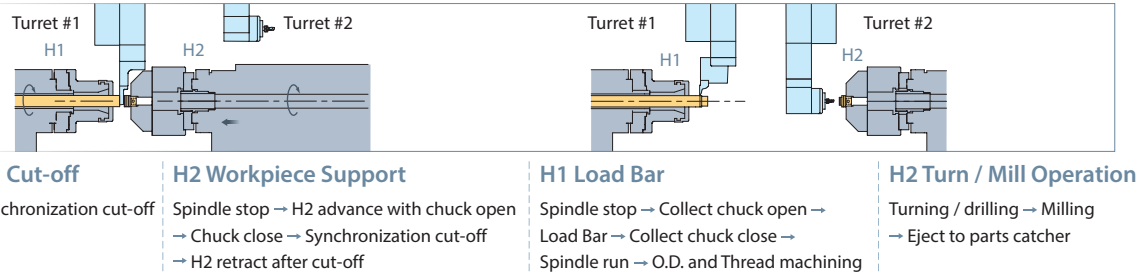
The 1st and 2nd spindle synchronous cutting makes GTS series functional as two multi-tasking machines.





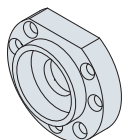
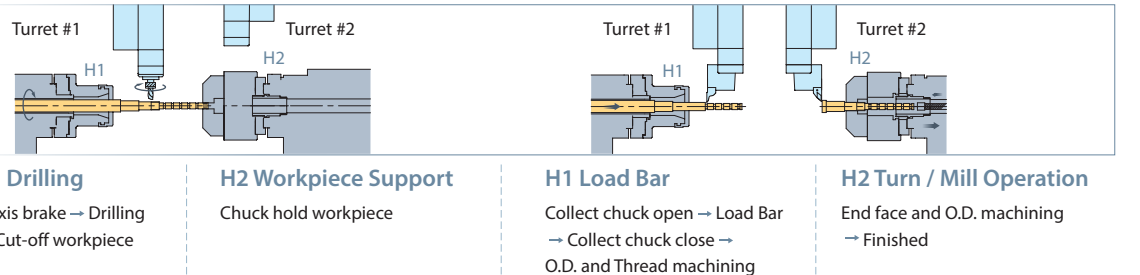
Small Parts

With optional bar feeder

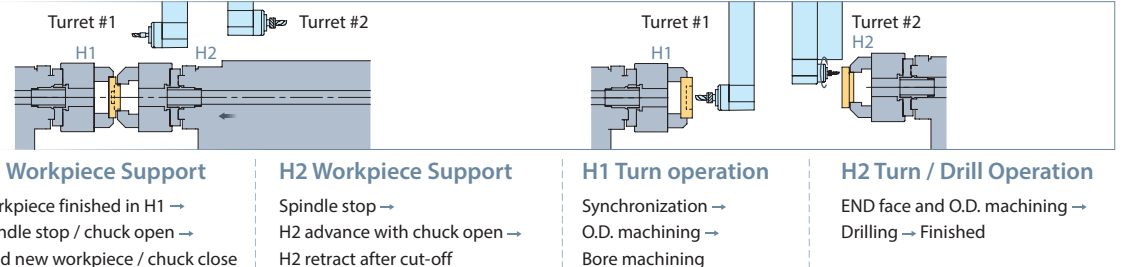


Long Parts

With optional bar feeder



Casting / Forge Parts



MULTI-TURRET CNC TURNING CENTERS

- ▶ Opposite twin turrets design on GTS, the 2nd spindle can move directly through Z2 guide way to 1st spindle to catch the parts which saves the floor space and the cost buying robot arm to flip the workpiece.
- ▶ Compare to single turret type of machine can work one side machining only, the twin turrets design separately for OP1 and OP2 with different operation performs higher efficiency.
- ▶ Compound function of optional live tooling turret, C-axis and Y-axis enable GTS series with the extreme cutting ability of 8 axes control and 4 axes simultaneously machining.



GTS-200MMX model shown with optional accessories.



Compact Machine Size

Machine dimensions (W x D)

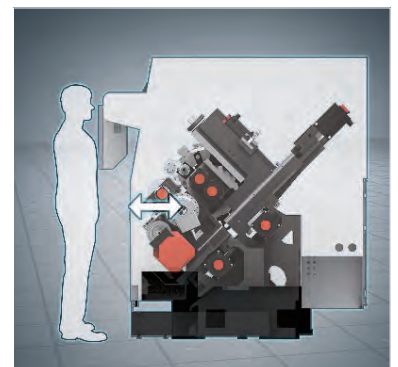
GTS-150 : 3,135 x 1,700 mm
 GTS-200 : 3,900 x 1,940 mm
 GTS-260 : 3,900 x 1,940 mm



Plenty of Space For Operator

Door Full opened width.

GTS-150 : 820 / 805 mm (T12 / T6)^{*1}
 GTS-200 : 1,065 mm
 GTS-260 : 1,065 mm



Convenient Working Distance

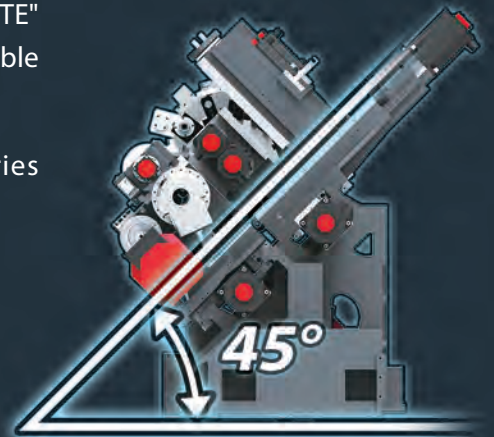
Distance from the center of spindle to door guarding.

GTS-150 : 459 mm
 GTS-200 : 394 mm
 GTS-260 : 394 mm

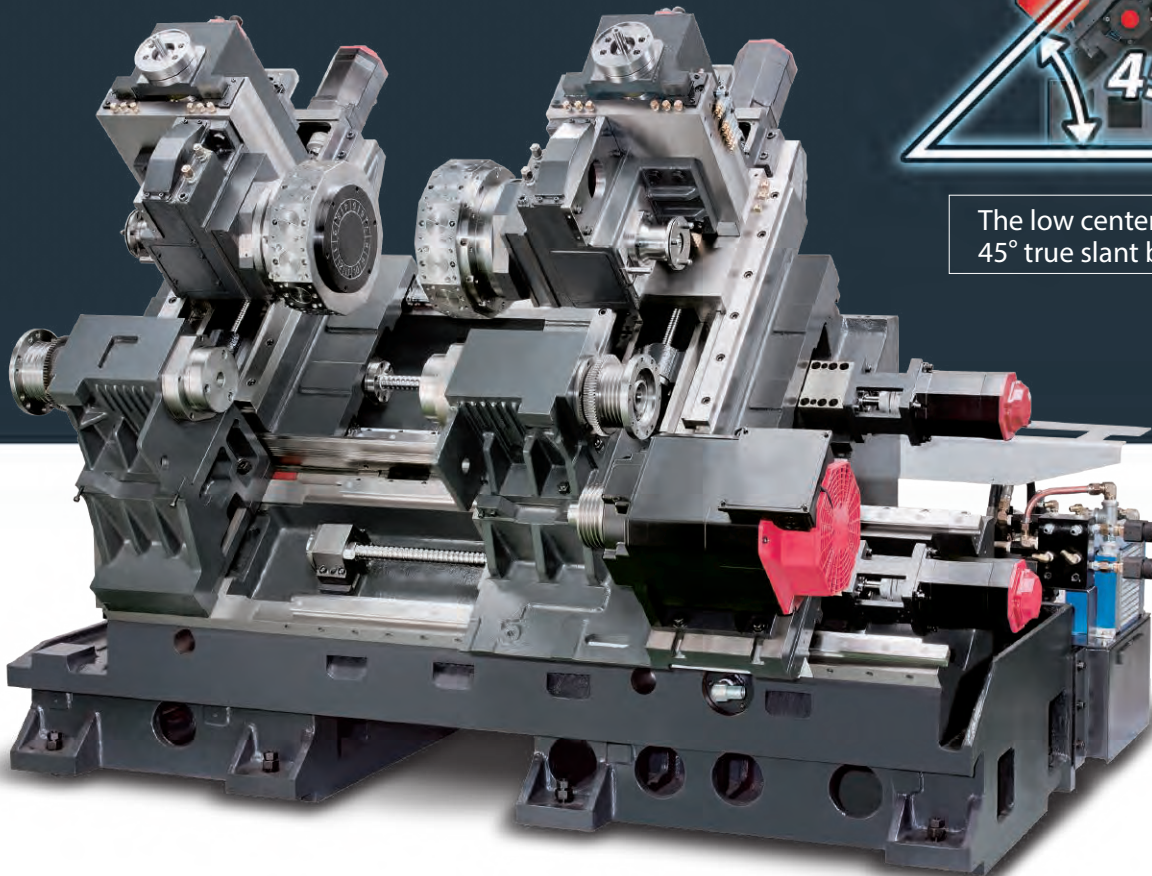
^{*1} : Please see page 7 for detail of turret type

SUPER RIGID STRUCTURE

- ▶ The Finite Element Analysis (FEA) provides optimal machine design and light-weight structure advantage while ensuring super rigid of machine.
- ▶ High rigidity machine bed are built by one-piece casting of "MEEHANITE" and the 45° slant bed design provides the most rigid foundation possible for the headstock and turret.
- ▶ All spindles and servo motors, including drives, are FANUC α i series components to ensure peak machining performance and accuracy.



The low center of gravity
45° true slant bed design.



High Speed Linear Guide Ways

GTS-150 series

Linear guide ways design can provide optimal motion and efficiency to meet the high speed high precision working condition on GTS-150 series.

(Box ways design on X / Y axes for "Y" models)



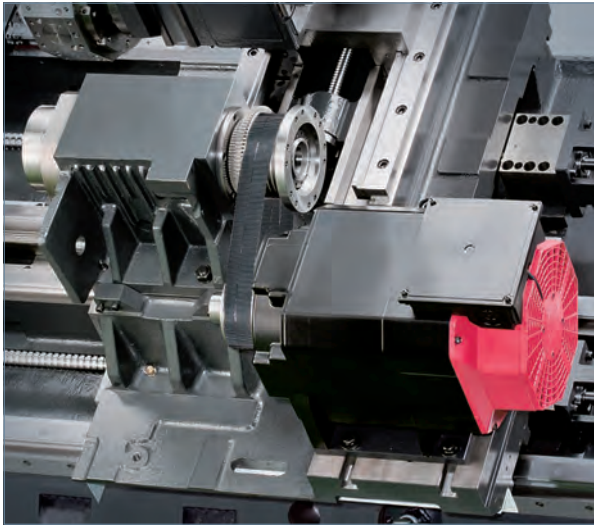
Super Rigid Box Ways

GTS-200 series
GTS-260 series

High rigidity box ways design which is through heat treatment and precise finishing processes meet the need of GTS-200 / GTS-260 series for heavy cutting and interrupted turning.



ULTIMATE TURNING POWER

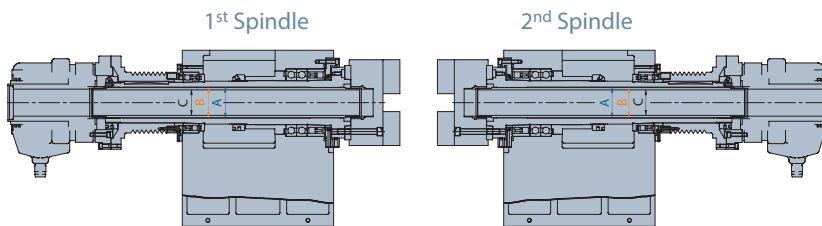


P4 grade high precision bearings are directly assembled for maximum level of support. Bearing configuration is designed for super heavy-duty cutting and long term durability with a higher level of accuracy.

Generating twice the torque output of standard motors, the standard wide-range spindle motor is designed to reach full output at 1/2 the RPM of standard motors, providing the ability to take heavier cuts in the lower RPM ranges.

Spindle Dimensions Drawing

A : Hole through spindle B : Draw tube OD. C : Draw tube ID.

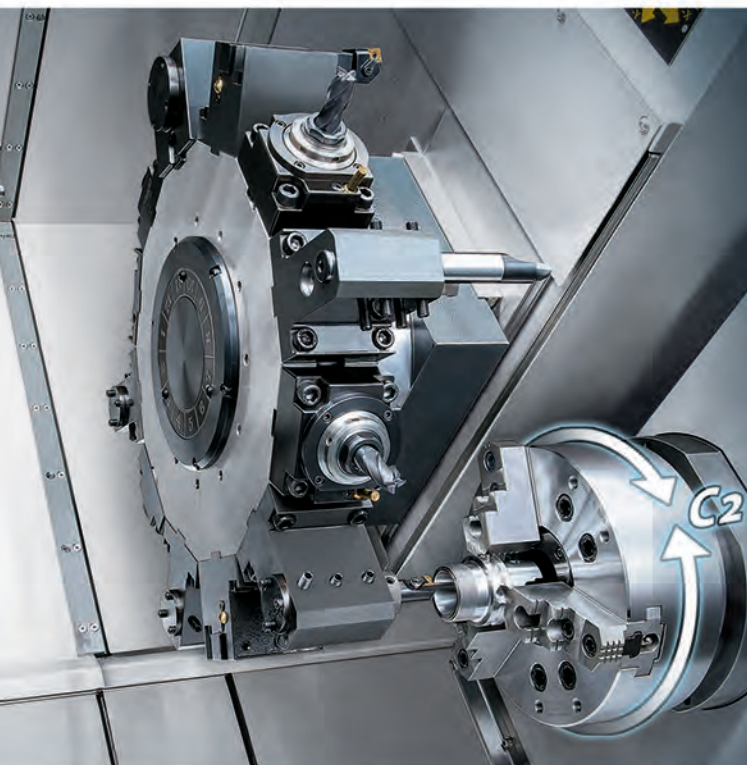


	A	B	C
GTS-150	61	50	43
GTS-200	66	65	52
GTS-260	76	75	66

Unit : mm

LIVE TOOLING TURRET & C-AXIS

Option



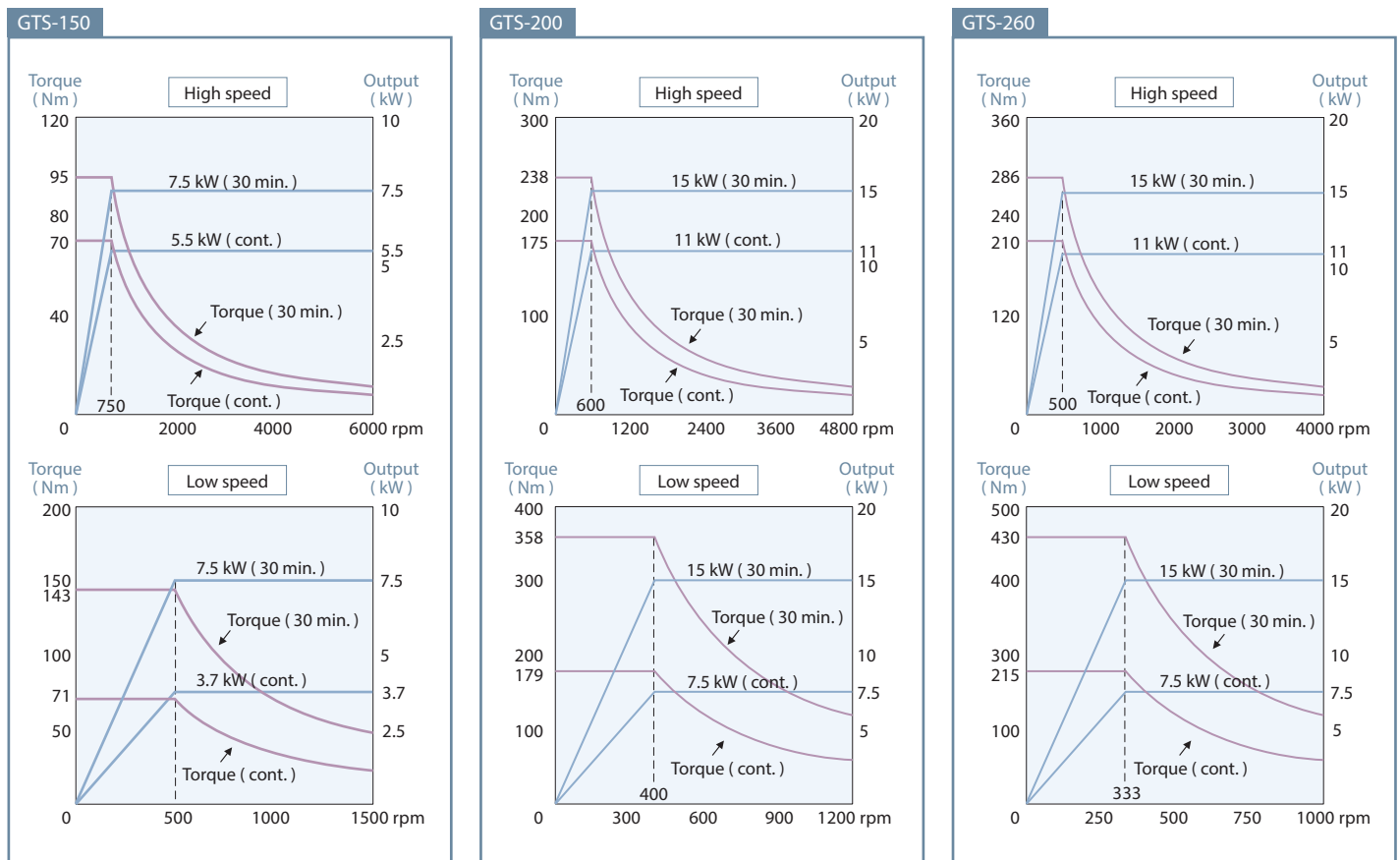
GOODWAY's Live Tooling Turret

Servo drive live tooling turret with high precision curvic coupling tool indexing system provides quick tool change and indexing time. And make sure the rigidity of turret in any machining conditions.

Turret type	T12	T6
Stations	12	
Live tooling stations	12	6
Tool drive	Live tooling tools rotate in working position only	Live tooling tools rotate at the same time

GTS series with optional GOODWAY T12 or T6 live tooling turret of different performance can easily meet your machining needs.

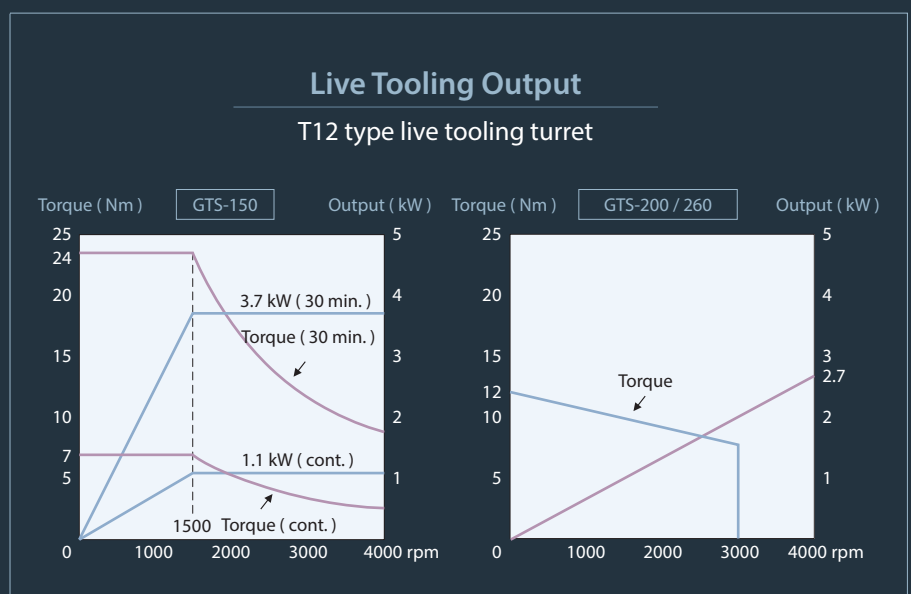
Spindle Output



Ultimate C-axis Spindle

C-axis adopts super rigid Cf-axis with disk brake system, and with the FANUC servo motor generating 240 Nm (cont.) of torque it offers excellent surface finishes and accuracy. Plus, dynamic accuracy is within $\pm 0.02^\circ$ even under heavy cutting condition.

Models	C-axis Output
GTS-150	120 Nm
GTS-200 / 260	240 Nm

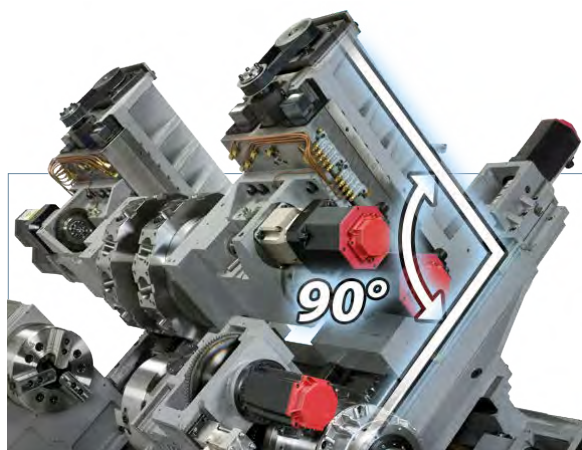
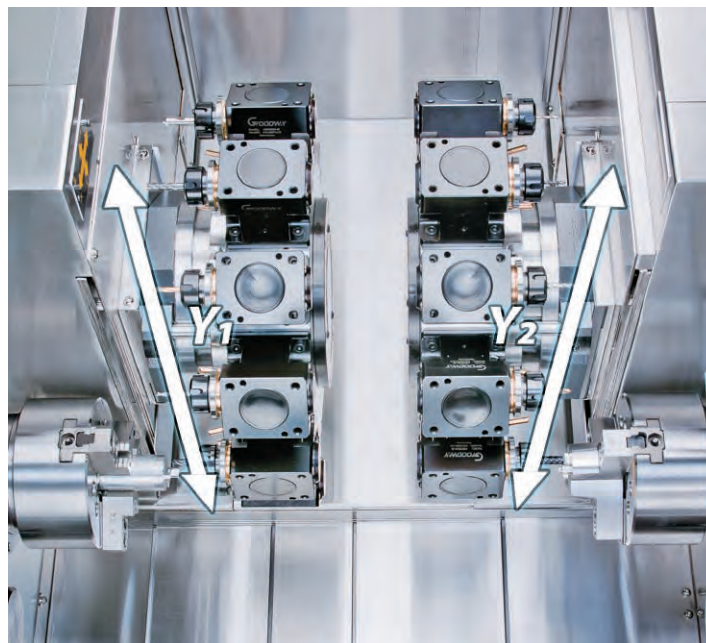


(Please contact with GOODWAY for T6 type live tooling turret output diagram)

TWIN Y AXES CONTROL FUNCTION Option

The optional Y-axis control can achieve X, Y, Z and C axes simultaneously machining, which allows the series can work on Y-axis off center milling, drilling and tapping as well as improving the machining accuracy from a regular 3 axes simultaneously machining processes under certain condition.

Models	Y-axis Travel
GTS-150	60 (±30) mm
GTS-200	120 (±60) mm
GTS-260	120 (±60) mm



Low Center of Gravity with Orthogonal Design

Orthogonal design of Y & X axes saddle to keep the center of gravity of turret lay on the proper range of slide on the base to make sure the overall structural rigidity.

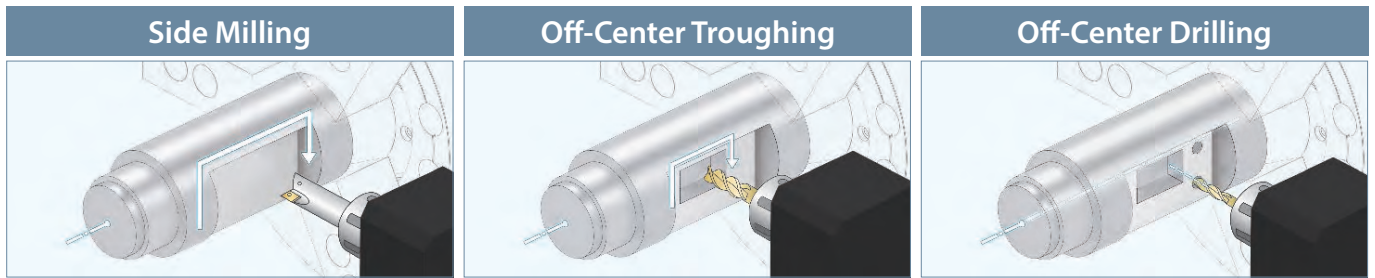
AUTOMATIC PRODUCTION SYSTEM Option

Optional automation accessories can greatly enlarge the capability for mass production. From workpiece loading, front / rear cutting, accuracy check and workpiece unloading can be done in one machine. It saves manpower and non-cutting time.

GTS-150XY with auto. loading / unloading system



Unique Y-axis Machining Capability



High Precision Y-axis Machining Capability

Polar coordinate interpolation V.S Y-axis control	O.D. Troughing
<p>The diagram shows a circular workpiece with a central hole. A red dot marks the 'Spindle center'. The X-axis is labeled with 'X(-)' on the left and 'X(+)' on the right. Two curved arrows indicate the rotation of the workpiece. Two inset boxes show: 'Polar coordinate interpolation' with a red arrow pointing to a curved path, and 'Y-axis control' with a straight horizontal line.</p> <ul style="list-style-type: none"> ▶ The polar coordinate interpolation can work on troughing or contouring. X-axis reverses at cross point of the center point of workpiece and contour, which makes tool not able to be completely contouring and remains worse accuracy. ▶ With Y-axis control, it can avoid the situation above and remain better accuracy. 	<p>The diagram shows two cross-sections of a cylindrical workpiece with a trough. The top cross-section shows a drill bit machining a trough that is not perfectly parallel to the outer diameter. The bottom cross-section shows a drill bit machining a trough that is perfectly parallel to the outer diameter.</p> <ul style="list-style-type: none"> ▶ Without featuring Y-axis, width of troughs are not perfectly parallel with worse accuracy. ▶ Featuring Y-axis, width of trough remains parallel with better accuracy.



Bar Feeder



Parts Catcher



Parts Collecting Box



Parts Conveyor



Workpiece Inspection Probe

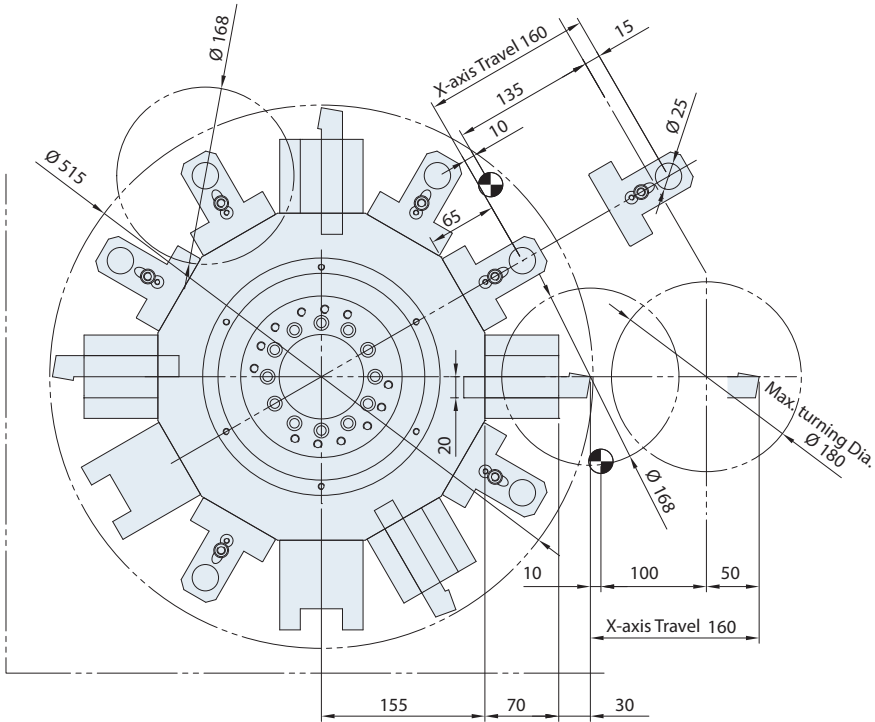


Tool Presetter

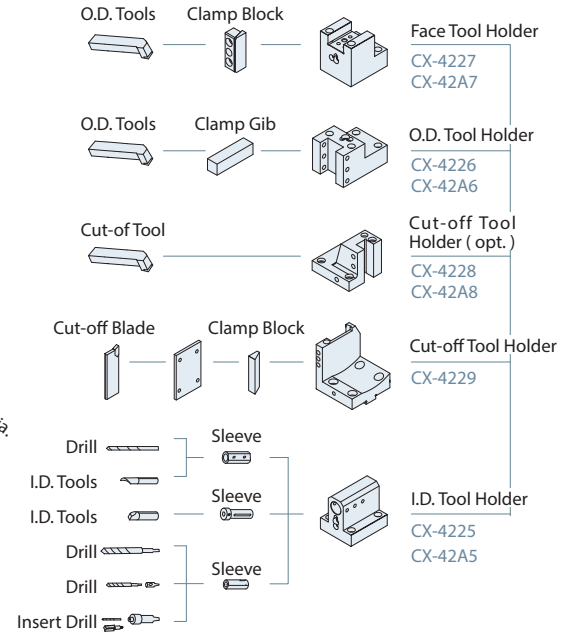
GENERAL DIMENSION

Interference Diagram

Standard turret **GTS-150X**

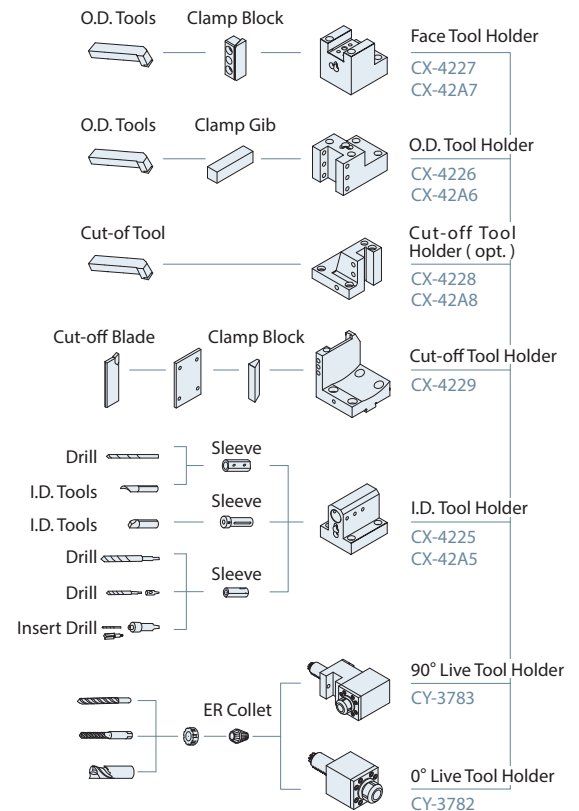
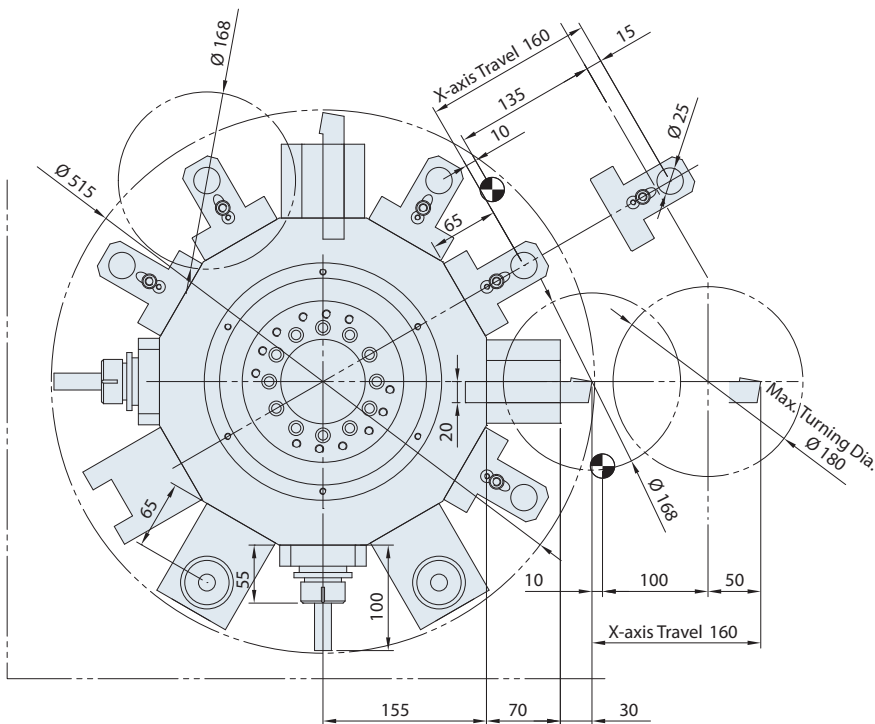


Tooling System



T12 type live tooling turret **GTS-150MMX**

(Specification of T6 type live tooling turret, please contact with GOODWAY for more information)

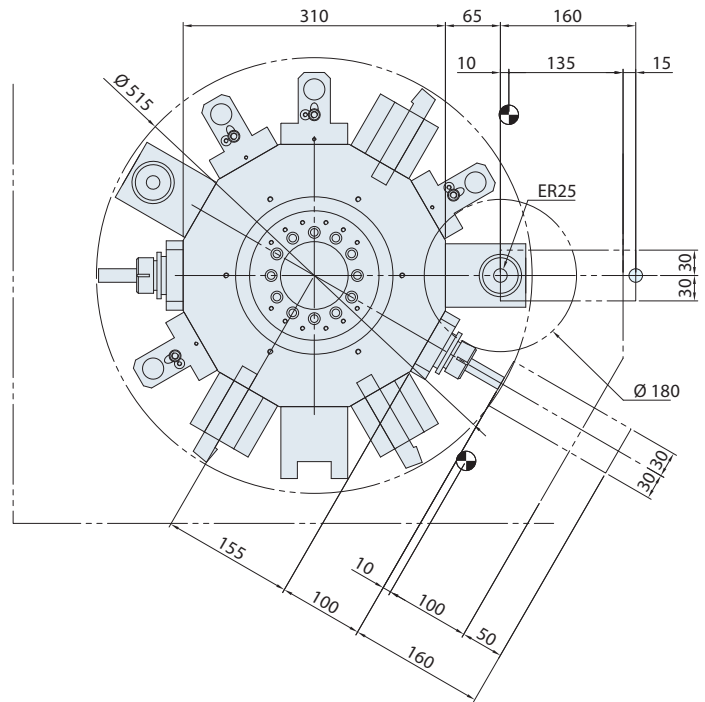
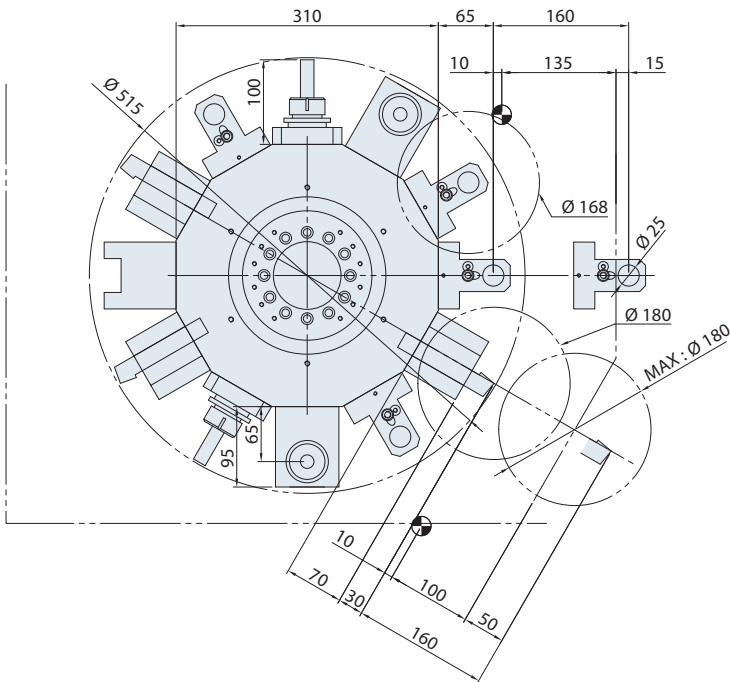


Interference Diagram

T12 type live tooling turret & Y-axis **GTS-150XY**

► I.D. / O.D. Tool

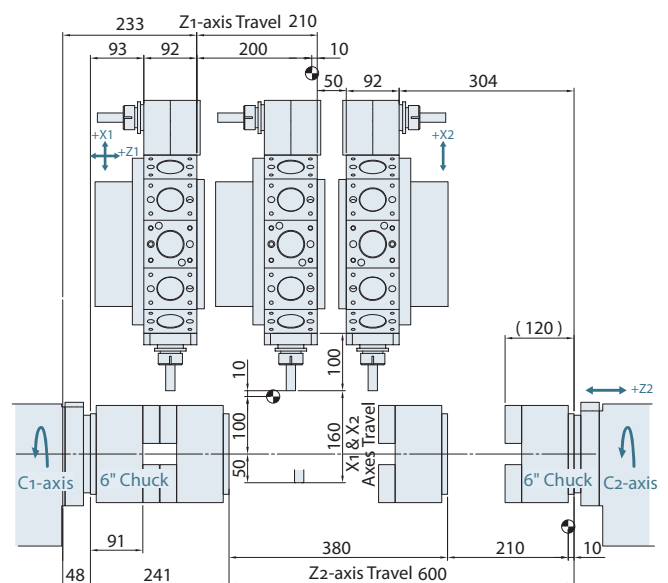
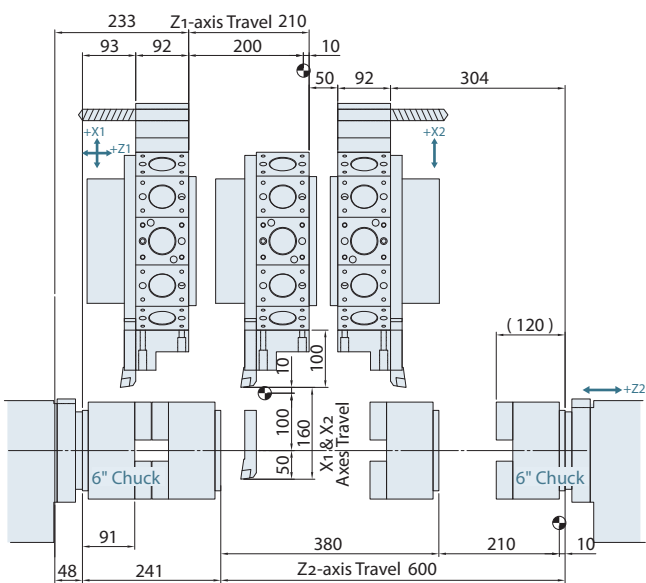
► Live Tool



Work Range

Standard turret **GTS-150X**

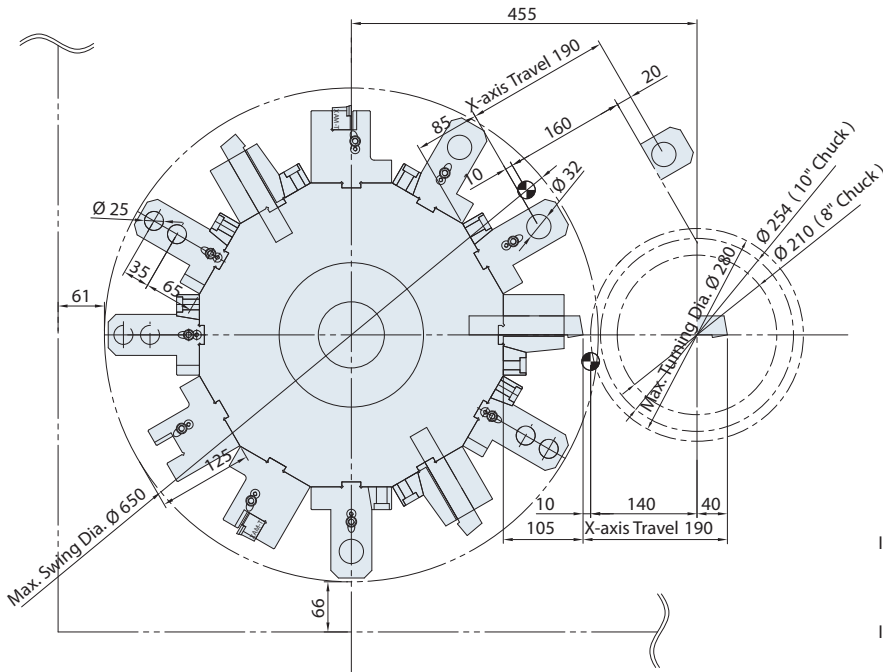
T12 type live tooling turret **GTS-150MMX / GTS-150XY**



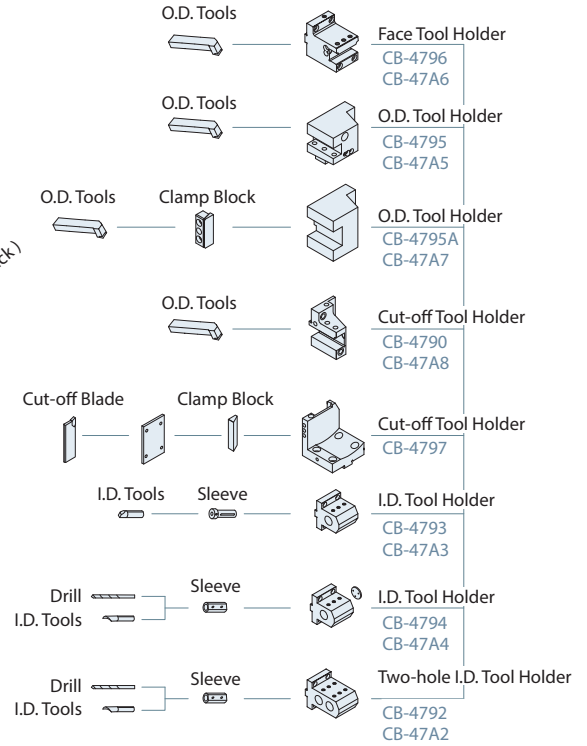
Unit : mm

Interference Diagram

Standard turret GTS-200X / GTS-260X

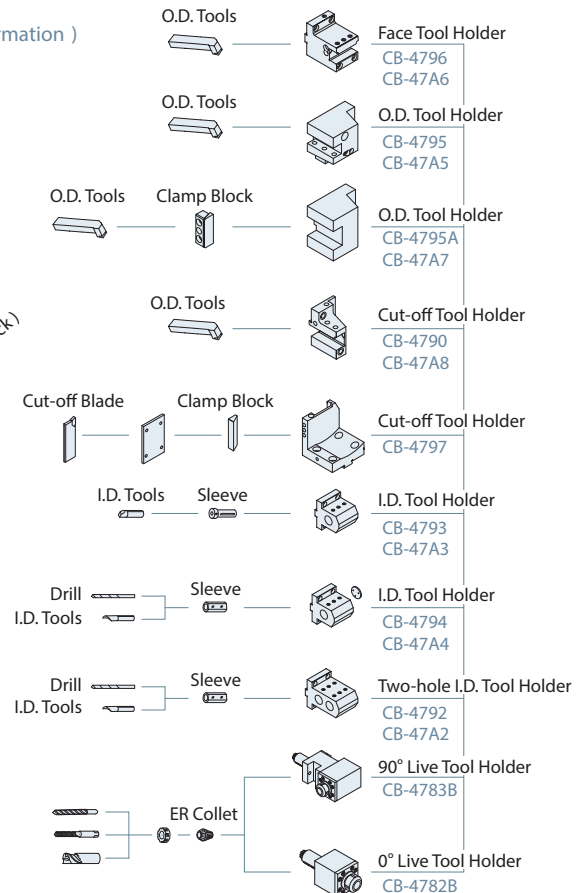
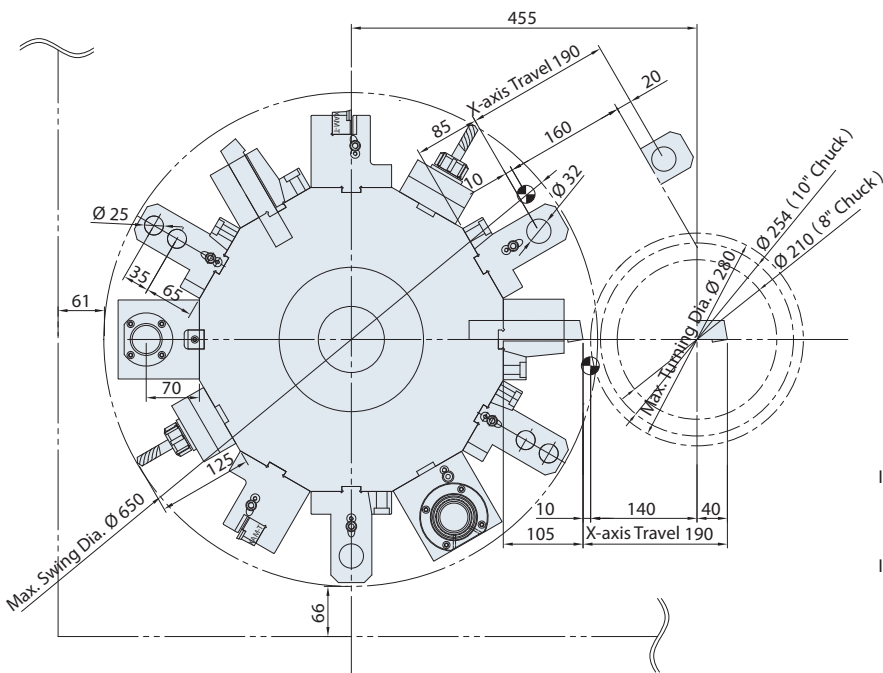


Tooling System



T12 type live tooling turret GTS-200MMX / GTS-260MMX

(Specification of T6 type live tooling turret, please contact with GOODWAY for more information)



NC INTELLIGENCE **G.LINC 350** Option



Advanced Hardware Combined with Intelligent Software, Makes Your Machine Smarter

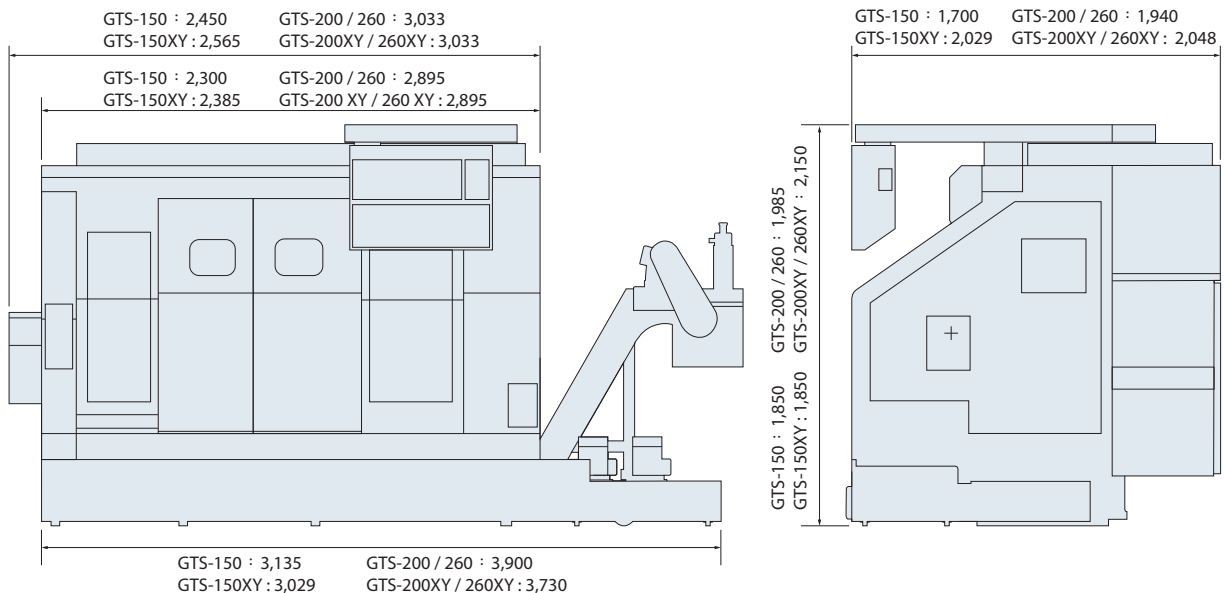
- ▶ Advanced hardware
- ▶ Outstanding operability
- ▶ Streamlined programming
- ▶ High security and shortened machining setting
- ▶ Reliable continuous operation
- ▶ Shortened troubleshooting time
- ▶ Improved utilization rate

Comprehensive Functions

Programming	Setting	Test-Run	Actual Production	Daily Used
Program management Friendly programming environment Programming auxiliary Manual Guide <i>i</i> Embedded E-manual	3D advance tool path and cutting simulation	Tool load monitor Program check Smart balance ection 3D Real-time cutting simulation and interference check	Tool load monitor 3D Real-time cutting simulation and interference check	Safety signal viewer Fast alarm check productivity Productivity management Twin operation system switch Maintenance management



MACHINE DIMENSIONS



Unit : mm

STANDARD & OPTIONAL FEATURES

S : Standard O : Option
 - : Not Available C : Contact GOODWAY

		GTS-150	GTS-200	GTS-260
1st & 2nd SPINDLE				
Main spindle motor configuration	Belt driven	S	S	S
Rigid tapping & spindle orientation		S	S	S
Spindle disk brake		O	O	O
Cf-axis & spindle disk brake*1		O	O	O
WORK HOLDING				
Hydraulic hollow cylinder for chuck	6"	S	-	-
	8"	-	S	-
	10"	-	-	S
Hydraulic hollow 3-jaw chuck	6"	S	-	-
	8"	-	S	-
	10"	-	-	S
Hard jaws		O	O	O
Collet chuck		O	O	O
Special work holding chuck		C	C	C
In spindle work stopper		O	O	O
Spindle liner (guide bushing)		O	O	O
Foot switch for chuck operation		S	S	S
1st & 2nd TURRET				
12-station turret		S	S	S
12-station live tooling turret (Goodway T12 type or T6 type)		O	O	O
Tool holder & sleeve package		S	S	S
Live tooling tool holders (0°x2, 90°x2)*1		O	O	O
MEASUREMENT				
RENISHAW HPRA tool presetter		O	O	O
COOLANT				
Coolant pump	3 kg/cm ²	S	S	S
	5 kg/cm ²	O	O	O
	10 kg/cm ²	O	O	O
High-pressure coolant system	20 kg/cm ²	C	C	C
Roll-out coolant tank		S	S	S
Oil skimmer		O	O	O
Coolant flow switch		O	O	O
Coolant level switch		O	O	O
Coolant intercooler system		O	O	O
CHIP DISPOSAL				
Chip conveyor with auto timer	Right discharge	S	S	S
	Rear discharge	C	C	C
Chip cart with coolant drain		O	O	O
Chuck air blow		O	O	O
Coolant gun		O	O	O
Oil mist collector		O	O	O
AUTOMATIC OPERATION SUPPORT				
Parts catcher		O	O	O
Work-piece transport conveyor		O	O	O
Bar feeder		O	O	O
Bar feeder interface		O	O	O
Gantry-type loader / unloader		O	O	O
Auto door		O	O	O
Extra M-code output	4 sets (8)	O	O	O
	8 sets (16)	O	O	O
SAFETY				
Fully enclosed guarding		S	S	S
Door interlock (incl. Mechanical lock)		S	S	S
Impact resistant viewing window		S	S	S
Chuck cylinder stroke out-end check		S	S	S
Chuck cylinder check valve		S	S	S
Low hydraulic pressure detection switch		S	S	S
Over travel (soft limit)		S	S	S
Load monitoring function*2		O	O	O

*1 Available for live tooling turret or Y-axis model.

*2 Available for Oi -TF controller.

*3 10.4" color LCD option needed.

		GTS-150	GTS-200	GTS-260
OTHERS				
Tri-color operation status light tower		S	S	S
Florescent work light		S	S	S
External work light		O	O	O
Electrical cabinet	Heat exchanger	S	S	S
	A/C cooling system	O	O	O
Complete hydraulic system		S	S	S
Advanced auto lubrication system		S	S	S
Emergency maintenance electrical part package		S	S	S
Operation & maintenance manuals		S	S	S
		Oi -TF	3i	
FANUC CONTROL FUNCTIONS				
Display	10.4" color LCD	S	S	
Graphic function	Standard	S	S	
	Dynamic	O	O	
Part program storage size	512K bytes	S	-	
	1M bytes	-	S	
	2M bytes	O	O	
	4M bytes	-	O	
	8M bytes	-	O	
Registerable programs	400	S	-	
	1,000	O	S	
	4,000	-	O	
	99	-	S	
	128	S	-	
	200	O	O	
Tool offset pairs	400	-	O	
	499	-	O	
	999	-	O	
	2000	-	O	
Servo HRV control	HRV 3	S	S	
Automatic data backup		S	S	
Synchronous / Composite control		O	O	
Inch / metric conversion		S	S	
Polar coordinate interpolation		S	S	
Cylindrical interpolation		S	S	
Multiple repetitive cycle		S	S	
Rigid tapping		S	S	
Unexpected disturbance torque detection function		S	S	
Spindle orientation		S	S	
Constant surface speed control		S	S	
Spindle speed fluctuation detection		S	S	
Embedded macro		O	O	
Spindle synchronous control		S	S	
Background editing		S	S	
Tool radius / Tool nose radius compensation		S	S	
Multi-language display		S	S	
Cs contouring control		S	S	
Polygon turning		S	S	
Helical interpolation		O	O	
Direct drawing dimension programming		S	S	
Thread cutting retract		S	S	
Variable lead threading		S	S	
Multiple repetitive cycle II		S	S	
Canned cycles for drilling		S	S	
Tool nose radius compensation		S	S	
Chamfering / Corner R		S	S	
AI contour control I		O	S	
Multi part program editing*3		S	S	
Manual handle retrace		O	O	
Manual intervention and return		S	O	
External data input		S	S	
Addition of custom macro		S	S	
Increment system C		S	S	
Run hour & parts counter		S	S	
Auto power-off function		S	S	
RS-232 port		S	S	
Memory card input / output (CF + USB)		S	S	
Ethernet		S	S	

Specifications are subject to change without notice.

MACHINE SPECIFICATIONS

CAPACITY	GTS-150	GTS-200	GTS-260
Max.swing diameter	Ø 180 mm 7.08"	Ø 280 mm 11.02"	Ø 280 mm 11.02"
Swing over saddle (door)	Ø 180 mm 7.08"	Ø 280 mm 11.02"	Ø 280 mm 11.02"
Max. turning diameter	Ø 180 mm 7.08"	Ø 280 mm 11.02"	Ø 280 mm 11.02"
Standard turning diameter	Ø 170 mm 6.69"	Ø 210 mm 8.26"	Ø 210 mm 8.26"
Max. turning length	180 mm 7.08"	200 mm 7.87"	200 mm 7.87"
Hydraulic chuck	6"	8"	10"
Bar capacity	Ø 42 mm 1.65"	Ø 51mm 2"	Ø 65 mm 2.55"
1st & 2nd SPINDLE			
Hole through spindle	Ø 51 mm 2"	Ø 66 mm 2.598"	Ø 76 mm 2.99"
Spindle bearing diameter	Ø 80 mm 3.14"	Ø 100 mm 3.93"	Ø 120 mm 4.72"
Hydraulic cylinder	6"	8"	10"
Spindle nose	A2-5	A2-6	A2-8
Motor output (cont. / 30 min.)	5.5 / 7.5 kW 7.4 / 10 HP	11 / 15 kW 15 / 20 HP	11 / 15 kW 15 / 20 HP
Motor full output speed	750 rpm		
Spindle drive system	Direct Belt Drive		
Spindle drive ratio	1 : 1	4 : 5	2 : 3
Spindle speed range	6,000 rpm	4,800 rpm	4,000 rpm
Spindle full output speed	750 rpm	600 rpm	500 rpm
C-AXIS (OPT.)			
Cf-axis drive motor	FANUC AC Servo motor		
Min. spindle indexing angle	± 0.001°		
Dynamic accuracy	± 0.002°		
X / Z AXES			
X-axis travel	160 mm 6.29"	190 mm 7.48"	190 mm 7.48"
Z ₁ / Z ₂ axes travel	210 / 600 mm 8.26" / 23.6"	270 / 740 mm 10.6" / 29.1"	270 / 740 mm 10.6" / 29.1"
X / Z axes rapids	15 / 36 m/min. 590 / 1,417 IPM	20 / 24 m/min. 787 / 945 IPM	20 / 24 m/min. 787 / 945 IPM
Slide way type	Linear guide way	Box way	Box way
Feed rates	1~ 4,800 mm/min. 0.039 ~ 189 IPM		
X-axis servo motor	AC 1.6 kW 2 HP	AC 3 kW 4 HP	AC 3 kW 4 HP
Z-axis servo motor	AC 1.6 kW 2 HP	AC 3 kW 4 HP	AC 3 kW 4 HP
X-axis ball screw Ø / pitch	Ø 32 mm 1.25" / Pitch 6	Ø 32 mm 1.25" / Pitch 10	Ø 32 mm 1.25" / Pitch 10
Z-axis ball screw Ø / pitch	Ø 32 mm 1.25" / Pitch 12	Ø 36 mm 1.41" / Pitch 10	Ø 36 mm 1.41" / Pitch 10
X / Z axes thrust (cont.)	855 / 427 kgf	769 / 769 kgf	769 / 769 kgf
1st & 2nd TURRET			
Stations	12		
Indexing drive	FANUC AC Servo motor		
Indexing speed	0.2 sec. Adjacent / 0.5 sec. 180 degrees (Single step)		
Accuracy	Positioning : ± 0.00069°, Repeatability : ± 0.00027°		
O.D. tool shank size	□ 20 mm 3/4"	□ 25 mm 1"	□ 25 mm 1"
I.D. tool shank size	Ø 25 mm 1"	Ø 32 mm 1-1/4"	Ø 32 mm 1-1/4"

LIVE TOOLING TURRET (OPT.)	GTS-150	GTS-200	GTS-260
Max. turning length	180 mm 7.08"	200 mm 7.87"	200 mm 7.87"
Stations	12		
Live tooling stations	T12	12 (Live tooling tools rotate in working position only)	
	T6	6 (Live tooling tools rotate at the same time)	
Live tooling drive motor	T12	1.1 / 3.7 kW 1.5 / 5 HP (cont. / 30 min.)	2.7 kW 3.6 HP
	T6	2.2 / 3.7 kW 3 / 5 HP	
Live tooling torque	T12	7 / 23.6 Nm (cont.) 5.16 / 17.4 lb-ft	12 Nm 8.8 lb-ft
	T6	14 / 23.6 kW 18.8 / 31.6 HP	
Index speed	0.3 sec. Adjacent / 0.5 sec. 180 degrees (Single step)		
O.D. tool shank size	□ 20 mm 3/4"	□ 25 mm 1"	□ 25 mm 1"
I.D. tool shank size	∅ 25 mm 1"	∅ 32 mm 1-1/4"	∅ 32 mm 1-1/4"
Live tooling shank size	T12	ER25 (∅16 mm) 5/8"	ER32 (∅20 mm) 3/4"
	T6	ER25 (∅16 mm) 5/8"	
Live tooling rpm range	4,000 rpm		
Y-AXIS (OPT.)			
Max. turning diameter	∅ 180 mm 7.08"	∅ 280 mm 11.02"	∅ 280 mm 11.02"
Max. turning length	180 mm 7.08"	200 mm 7.87"	200 mm 7.87"
Max. Y-axis travel	60 (±30) mm 2.3" (±1.1")	120 (±60) mm 4.7" (±2.3")	120 (±60) mm 4.7" (±2.3")
Y-axis rapids	10 m/min. 393 IPM	6 m/min. 236 IPM	6 m/min. 236 IPM
Slide way type	Box way (X / Y axes)	Box way	Box way
Feed rates	1 ~ 4,800 mm/min. 0.039 ~ 189 IPM		
Y-axis servo motor	AC 1.6 kW 2 HP		
Y-axis ball screw ∅ / pitch	∅ 32 mm 1.25" / Pitch 6		
Y-axis thrust (cont.)	855 kgf		
PARTS CATCHER (OPT.)			
Max. workpiece diameter	∅ 42 mm 1.65"	∅ 65 mm 2.55"	∅ 65 mm 2.55"
Max. workpiece length	130 mm 5.1"	160 mm 6.29"	160 mm 6.29"
Max. workpiece weight	3 kg 6.6 lb	3 kg 6.6 lb	3 kg 6.6 lb
GENERAL			
Repeatability	± 0.003 mm ± 0.000118"		
Positioning accuracy	0.01 mm 0.00039"		
Standard CNC control	FANUC Oi-TF (opt. 31i)		
Voltage / Power requirement	AC 200 / 220 +10% to -15% 3 phase / 30 kVA		
Hydraulic capacity	50 L 13 gal	30 L 7.9 gal	30 L 7.9 gal
Coolant tank capacity	140 L 36 gal	150 L 39 gal	150 L 39 gal
Coolant pump / pressure	0.5 kW (3/4 HP , 60 Hz) rated at 3 bar (43.5 PSI)		
Machine weight	6,000 Kg 13,300 lb	7,800 Kg 17,200 lb	7,800 Kg 17,200 lb
Machine weight (Y-axis model)	7,000 kg 15,500 lb	8,500 kg 18,800 lb	8,500 kg 18,800 lb
Dimensions L × W × H	2,450 x 1,700 x 1,850 mm 97" x 67" x 73"	3,033 x 1,940 x 1,985 mm 120" x 77" x 79"	3,033 x 1,940 x 1,985 mm 120" x 77" x 79"
Dimensions L × W × H (Y-axis model)	2,535 x 2,030 x 1,950 mm 100" x 80" x 77"	3,035 x 2,049 x 2,150 mm 120" x 81" x 85"	3,035 x 2,049 x 2,150 mm 120" x 81" x 85"

Specifications are subject to change without notice.



GOODWAY MACHINE CORP.



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